

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Fisher et al.

Art Unit: 2827

Serial No.: 09/705,466

Examiner: Thai, Luan C.

Filed: 11/03/2000


Docket No.: TI-24980

For: **ENCAPSULATION FOR PARTICLE ENTRAPMENT**

**APPEAL BRIEF UNDER 37 C.F.R. § 1.192**

22 June 2003

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

MAILING CERTIFICATE UNDER 37 C.F.R. § 1.8(A)	
I hereby certify that the above correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Commissioner For Patents, PO Box 1450, Alexandria, Virginia 22313-1450 on the date shown below.	
	6-23-2003
Charles A. Brill	Date

Dear Sir:

The following Appeal Brief is respectfully submitted, in triplicate, in connection with the above-identified application in response to the Final Rejection mailed 24 October 2002, and the Advisory Action mailed 23 April 2003. Please charge all required fees to deposit account 20-0668.

**REAL PARTY IN INTEREST**

The real party in interest is Texas Instruments Incorporated, to whom this application is assigned.

**RELATED APPEALS AND INTERFERENCES**

There are no related appeals or interferences known to the Applicant's legal representative.

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## **STATUS OF THE CLAIMS**

This application was originally filed with sixteen claims, two of which were written in independent form. Claims 11-16 have been withdrawn from consideration as being directed to a non-elected invention in response to a restriction requirement filed 29 January 2002. Claims 1 and 2 were amended on 12 July 2002, and Claim 2 was amended on 29 January 2003.

## **STATUS OF THE AMENDMENTS**

An amendment after the final rejection was filed on 29 January 2003. The Examiner stated the amendment after final would be entered.

## **SUMMARY OF THE INVENTION**

Specification page 6, lines 3-11 and page 7, lines 11-15, provide a concise explanation of the invention defined in the appealed claims. The invention provides a method of blocking debris either release from debris harboring regions or generated by debris generating regions from migrating to debris-intolerant portions of a packaged micromechanical device. As shown in Figure 3, a blocking material (116) is deposited around the micromechanical device (100) to block debris from coming out from voids (112) underneath the device or from being released from the sidewalls of the device.

## **ISSUES**

1. Whether Claim 1 is unpatentable over Chun, U.S. Patent 5,644,169 in view of Glenn et al., U.S. Patent 6,117,705 under 35 U.S.C. § 103 (a) or over Kim et al., U.S. Patent 5,622,873 in view of Glenn et al., U.S. Patent 6,117,705 under 35 U.S.C. § 103 (a).

2. Whether Claim 5 is unpatentable over Chun, U.S. Patent 5,644,169 in view of Glenn et al., U.S. Patent 6,117,705 under 35 U.S.C. § 103 (a) or over Kim et al., U.S. Patent 5,622,873 in view of Glenn et al., U.S. Patent 6,117,705 under 35 U.S.C. § 103 (a).
3. Whether Claim 6 is unpatentable over Chun, U.S. Patent 5,644,169 in view of Glenn et al., U.S. Patent 6,117,705, and further in view of Wark, U.S. Patent 5,817,540 under 35 U.S.C. § 103 (a).

### **GROUPING OF THE CLAIMS**

Claims 1, 5, and 6 are independently patentable and stand or fall individually for the reasons more clearly set forth hereinbelow. Claims 2-4 and 7-10 stand or fall together with Claim 1, from which Claims 2-4 and 7-10 depend.

### **ARGUMENTS**

#### **Issue 1:**

1. Whether Claim 1 is unpatentable over Chun, U.S. Patent 5,644,169 in view of Glenn et al., U.S. Patent 6,117,705 under 35 U.S.C. § 103 (a), or over Kim et al., U.S. Patent 5,622,873 in view of Glenn et al., U.S. Patent 6,117,705 under 35 U.S.C. § 103 (a).

Claim 1 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,644,169 to Chun (“Chun”) in view of U.S. Patent No. 6,117,705 to Glenn et al. (“Glenn”), or in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,622,873 to Kim et al. (“Kim”) in view of Glenn. The applicant respectfully disagrees and submits the Examiner has failed to present a prima facie case of obviousness.

“To support the conclusion that the claimed combination is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed combination or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” Ex parte Clapp, 227 U.S.P.Q. 972, 973 (Bd. Pat. App. & Inter. 1985).

The Examiner has the duty to present a prima facie obviousness rejection. The Examiner stated, “Chun further teaches . . . attaching a package lid 7 (e.g., transparent lid) to the package substrate 1.” The Examiner further stated, “Glenn et al. . . . teach (see specifically figures 7 and 13) a step of encapsulating the side wall 104 (e.g., the debris generating regions) and the bond wire 208 by using a photo-curable adhesive blocking material (Col. 6, lines 6+, Col. 15, lines 34+), wherein the blocking material is avoiding contact with the debris-intolerant region 105 (Col. 16, lines 5+).”

Claim 1 recites, “attaching a device to a package substrate . . . and . . . attaching a package lid to said package substrate, to enclose said device and said blocking material.” The Examiner has not pointed to any teaching in Chun and Glenn that shows, teaches, or suggests this limitation in combination with the additional limitations of Claim 1. Glenn states, “Bead 320 of Fig. 7 has a lower portion 321 which is in contact with upper surface 201 of substrate 200; an upper portion 322 which is in a press-fitted interconnection with a peripheral portion 404 and edge 403 of lid 400; an inner portion 323 which is in contact with a side surface 104 of die 100 and covers the perimeter of upper surface 101 of die 100 . . . .” Thus, Glenn teaches away from “attaching a package lid to said package substrate, to enclose said device and said blocking material” as recited

by Claim 1, by teaching a bead to “form a solid package sidewall that surrounds the die 100 and adheres to and separates substrate 200 and lid 400” (column 16, lines 1-3)—holding the lid and the substrate apart rather than “attaching a package lid to said package substrate” as recited by Claim 1. Furthermore, the combination of Chun and Glenn devised by the Examiner does not suggest the limitation of “enclose[ing] said device and said blocking material” as recited by Claim 1, but rather uses the bead in combination with the substrate and lid to enclose the device, leaving the bead exposed.

The Examiner has failed to show an express or implied suggestion in the art, or provide any line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references as required by Ex Parte Clapp. The Examiner stated, “It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Glenn et al’s teachings to Chun device package in order to prevent external moisture which may penetrate substrate from reaching cavity and the chip, and thus prevents corrosion of the bonding pad (Col. 15, lines 57+).” The applicant respectfully submits that this is not a suggestion to modify Chun, as Chun’s package (shown in Figures 3 and 5) also limits moisture reaching the cavity and chip and corrosion of the bonding pad by encapsulating the lead frame, bonding wires, and die in the package resin.

For the reasons stated above, the Examiner has not met the burden of presenting a prima facie case of obviousness. Therefore, the rejection under 35 U.S.C. § 103(a) is defective and should be withdrawn.

As to the alternate rejection of Claim 1 as unpatentable over U.S. Patent No. 5,622,873 to Kim et al. (“Kim”) in view Glenn, the Examiner stated, Kim “teaches a

process identical to Chun's process; therefore, claims 1-5 and 7-10 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. in view of Glenn et al. (6,117,705 of record) for the similar reasons detailed above." As described by the Examiner, Kim also teaches a plastic encapsulated integrated circuit with a lid. The applicant respectfully submits that, for the reasons argued above with respect to Claim 1, Kim in view of Glenn does not show, teach, or suggest the limitations of Claim 1.

Issue 2:

2. Whether Claim 5 is unpatentable over Chun, U.S. Patent 5,644,169 in view of Glenn et al., U.S. Patent 6,117,705 under 35 U.S.C. § 103 (a) or over Kim et al., U.S. Patent 5,622,873 in view of Glenn et al., U.S. Patent 6,117,705 under 35 U.S.C. § 103 (a).

Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Chun in view of Glenn, or in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Kim in view of Glenn. The applicant respectfully disagrees and submits the Examiner has failed to present a prima facie case of obviousness.

The Examiner stated, "Regarding claim 5, Glenn et al. further teach the adhesive material being Hysol adhesive which inherently has a tacky characteristic and this adhesive would be obvious to include a gettering function." The Examiner has not provided any evidence that the suggested adhesive "remains tacky to perform a gettering function" as recited by Claim 5 and described at lines 14-16 of page 8 of the specification, nor has the Examiner suggested why a tacky material would be obvious given that much of the package exterior is formed by the bead (see Figures 1, 4, 5, 7, 9, and 12). Furthermore, the Examiner's suggestion appears to contradict the teachings of

Glenn, that the bead “is formed of an adhesive material that is viscous and flowable when it is initially applied onto upper surface 201 of substrate 200, but subsequently hardens, such as by heating at 150°C. for 60 minutes” (column 15, line 65 through column 16, line 1).

As to the alternate rejection of Claim 5 as unpatentable over U.S. Patent No. 5,622,873 to Kim et al. (“Kim”) in view Glenn, the Examiner stated, Kim “teaches a process identical to Chun’s process; therefore, claims 1-5 and 7-10 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. in view of Glenn et al. (6,117,705 of record) for the similar reasons detailed above.” As described by the Examiner, Kim also teaches a plastic encapsulated integrated circuit with a lid. The applicant respectfully submits that, for the reasons argued above with respect to Claim 5, Kim in view of Glenn does not show, teach, or suggest the limitations of Claim 5.

For the reasons stated above, the Examiner has not met the burden of presenting a prima facie case of obviousness. Therefore, the rejections under 35 U.S.C. § 103(a) is defective and should be withdrawn.

Issue 3:

3. Whether Claim 6 is unpatentable over Chun, U.S. Patent 5,644,169 in view of Glenn et al., U.S. Patent 6,117,705, and further in view of Wark, U.S. Patent 5,817,540 under 35 U.S.C. § 103 (a).

Claim 6 was rejected as being unpatentable over Chun in view of Glenn and further in view of U.S. Patent 5,817540 to Wark (“Wark”). The applicant respectfully disagrees.

The Examiner stated, “Regarding claim 6, the proposed process of Chun and Glenn et al. disclose(s) all the limitations of the claimed invention as detailed above except for the step of removing the block material from the debris-intolerant regions. Wark while related to a similar semiconductor device process teaches a step of forming an insulative material on an active surface of a device can be followed by a step of removing the insulative material at a predetermined area in order to dispose the predetermined surface area.”

The Examiner did not cite any specific teaching of Wark as support for the Examiner’s combination of Wark, Chun, and Glenn. The applicant has not found any passage in Wark that describes a debris intolerant region. To the contrary, Wark appears to teach applying insulative material over the entire active surface of the device, etching troughs in the insulative material and filling the trough with conductive material (column 3, lines 44-64. Not only do the teachings of Wark fail to mention debris-intolerant regions, Chun, Glenn, and Kim all expressly teach preventing the resin or bead from contacting the sensitive portions of the device.

Chun states, “In addition, on a circumferential portion of the upper surface of the protrusion 23 of the mold die 21b is provided a shoulder 23b, and on a circumferential portion of a lower surface of the protrusion 23 is provided an extension 23a for preventing the formation of resinous materials during molding.” (Column 4, lines 6-11.)

Glenn states, “In CCD or CMOS imaging applications, as exemplified by die 100 of Figure 5, care may be necessary in selecting and applying coating 219 to ensure that coating 219 does not contact sensing cell 105.” (Column 15, lines 24-27.)



Kim states, “the protected light-receiving region is separately treated during the molding so as to prevent contamination of the light-receiving region.” (Column 2, lines 8-11.)

The Examiner stated, “It would have been obvious to one of ordinary skill in the art at the time of the invention was made to apply Wark teachings to the proposed process of Chun and Glenn et al. by adding the step of removing the unwanted material on the surface of the device in order to dispose the predetermined surface area.” The applicant respectfully submits that the Examiner has failed to provide any suggestion in the prior art that would lead one of ordinary skill in the art to abandon the express teachings of the prior art references recited above and to make the modifications suggested by the Examiner.

For the reasons stated above, the Examiner has not met the burden of presenting a prima facie case of obviousness. Therefore, the rejection under 35 U.S.C. § 103(a) is defective and should be withdrawn.

### **CONCLUSION**

For the foregoing reasons, Appellants respectfully submit that the Examiner’s final rejection of Claims 1-10 under 35 U.S.C. § 103 (a) as being unpatentable over various combinations of Chun or Kim in view of Glenn and further in view of Wark is improper, and it is respectfully requested that the Board of Patent Appeals and Interferences so find and reverse the Examiner’s rejection.

Please charge any fees necessary in connection with the filing of this paper,  
including any necessary extension of time fees, to Deposit Account No. 20-0668 of Texas  
Instruments Incorporated.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read 'C. Brill'.

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## **APPENDIX**

1. (amended) A method of protecting debris-intolerant micromechanical devices, said method comprising:
  - attaching a device to a package substrate, said device having at least one debris-generating region, and at least one debris-intolerant region;
  - encapsulating at least one of said debris-generating regions with a blocking material, said blocking material avoiding contact with said debris-intolerant region; and
  - attaching a package lid to said package substrate, to enclose said device and said blocking material.
2. (twice amended) The method of Claim 1, said attaching a device step further comprising:
  - attaching a device to a substrate, said device having at least one said debris-generating region comprising a sidewall.
3. The method of Claim 1, said encapsulating step further comprising:
  - encapsulating at least one of said debris-generating regions using an adhesive blocking material.
4. The method of Claim 1, said encapsulating step further comprising:
  - encapsulating at least one of said debris-generating regions using a photo-curable adhesive blocking material.
5. The method of Claim 1, said encapsulating step further comprising:
  - encapsulating at least one of said debris-generating regions using an adhesive blocking material that remains tacky to perform a gettering function.

6. The method of Claim 1, said encapsulating step comprising the steps of:
  - encapsulating portions of said device with said blocking material; and
  - removing said blocking material from said debris-intolerant regions.
7. The method of Claim 1, further comprising the step of:
  - electrically connecting at least one bond pad on said substrate with at least one bond pad on said device using an electrical connection.
8. The method of Claim 7, said encapsulating step comprising:
  - encapsulating at least one of said debris-generating regions and said electrical connection.
9. The method of Claim 7, said encapsulating step comprising:
  - electrically connecting at least one bond pad on said substrate with at least one bond pad on said device using a bond wire.
10. The method of Claim 7, said encapsulating step comprising:
  - encapsulating at least one of said debris-generating regions and said bond wires.